

CLAIMS

1. A semiconductor device for emitting light when a voltage is applied comprising

- a first semiconductor region (3) whose conductivity is based on charge carriers of a first conductivity type,
- a second semiconductor region (5) whose conductivity is based on the charge carriers of a second semiconductor type, which have a charge opposite to the charge carriers of the first conductivity type, and
- an active semiconductor region (7A – 7C) which is arranged between the first semiconductor region (3) and the second semiconductor region (5) and in which quantum structures (13) of a semiconductor material with a direct band gap are embedded.

2. A semiconductor device as set forth in claim 1 wherein the first semiconductor region (3), the second semiconductor region (5) and the active semiconductor region (7A – 7C) each include $\text{Al}_x\text{Ga}_{1-x}\text{P}$ with $0 \leq x \leq 1$ and the quantum structures (13) are made from a III-V semiconductor material having a lattice constant which is greater than that of GaP.

3. A semiconductor device as set forth in claim 2 wherein the III-V semiconductor material includes InP.

4. A semiconductor device as set forth in claim 1, claim 2 or claim 3 wherein the semiconductor regions are embodied in the form of semiconductor layers (3, 5, 7A – 7C) of a layer stack.

5. A semiconductor device as set forth in one of claims 1 through 4 wherein the quantum structures (13) are of a lateral extent which on average is less than about 50 nm.

6. A semiconductor device as set forth in claim 5 wherein the average lateral extent of the quantum structures (13) is in the range of between 10 and 30 nm.

7. A semiconductor device as set forth in claim 3 and one of claims 4 through 6 wherein the InP coverage is at least 0.5 ML.

8. A semiconductor device as set forth in claim 7 characterised in that the active semiconductor region (7A – 7C) includes a plurality of sub-regions which have different InP coverages.

9. A light emitting diode comprising a semiconductor device as set forth in one of claims 1 through 8.

10. A superluminescent diode comprising a semiconductor device as set forth in one of claims 1 through 8.

11. A laser diode comprising a semiconductor device as set forth in one of claims 1 through 8.